

CLAIMS

What is claimed is:

1. A computerized method for graph rewriting comprising:
 - 1 comparing an input graph representing a description scheme for multimedia content with a set of pre-defined template graphs; and
 - 2 validating the input graph when there is a match with a template graph.

- 1 2. The computerized method of claim 1, wherein the comparing uses a graph matching process.
- 1 3. The computerized method of claim 2, wherein the comparing comprises:
 - 1 creating adjacency matrices representing the input graph and the set of template graphs.
- 1 4. The computerized method of claim 1 further comprising:
 - 1 evaluating the input graph against a set of pre-defined alphabet graphs; and
 - 2 applying a rule associated with a matching alphabet graph to the input graph, the rule represented by a rule graph and a set of morphism graphs.
- 1 5. The computerized method of claim 4, wherein the evaluating uses a graph matching process.
- 1 6. The computerized method of claim 5, wherein the evaluating comprises:
 - 1 creating adjacency matrices for the input graph and the set of alphabet graphs.

1 7. The computerized method of claim 4, wherein the applying comprises:
2 performing a pushout operation.

1 8. The computerized method of claim 4, wherein the applying comprises:
2 performing a pullback operation.

1 9. The computerized method of claim 8, wherein performing the pullback operation
2 comprises:

3 creating adjacency matrices representing smallest portions of the set of morphism
4 graphs that map the input and rule graphs to the alphabet graph using pre-images of parts
5 of the alphabet graph marked for change; and
6 multiplying the adjacency matrix associated with the input graph by a transpose of
7 the adjacency matrix associated with the rule graph.

1 10. A computer-readable medium having executable instructions to cause a computer
2 to perform a method comprising:
3 comparing an input graph representing a description scheme for multimedia
4 content with a set of pre-defined template graphs; and
5 validating the input graph when there is a match with a template graph.

1 11. The computer-readable medium of claim 10, wherein the comparing uses a graph
2 matching process.

1 12. The computer-readable medium of claim 11, wherein the comparing comprises:

2 creating adjacency matrices representing the input graph and the set of template
3 graphs.

1 13. The computer-readable medium of claim 11, wherein the method further
2 comprises:
3 evaluating the input graph against a set of pre-defined alphabet graphs; and
4 applying a rule associated with a matching alphabet graph to the input graph, the
5 rule represented by a rule graph and a set of morphism graphs.

1 14. The computer-readable medium of claim 13, wherein the evaluating uses a graph
2 matching process.

1 15. The computer-readable medium of claim 14, wherein the evaluating comprises:
2 creating adjacency matrices for the input graph and the set of alphabet graphs.

1 16. The computer-readable medium of claim 13, wherein the applying comprises:
2 performing a pushout operation.

1 17. The computer-readable medium of claim 13, wherein the applying comprises:
2 performing a pullback operation.

1 18. The computer-readable medium of claim 17, wherein performing the pullback
2 operation comprises:

3 creating adjacency matrices representing smallest portions of the set of morphism
4 graphs that map the input and rule graphs to the alphabet graph using pre-images of parts
5 of the alphabet graph marked for change; and
6 multiplying the adjacency matrix associated with the input graph by a transpose of
7 the adjacency matrix associated with the rule graph.

1 19. A system comprising:

2 a processor coupled to a memory through a bus; and
3 a validation process executed by the processor from the memory to cause the
4 processor to compare an input graph representing a description scheme for multimedia
5 content with a set of pre-defined template graphs, and to validate the input graph when
6 there is a match with a template graph.

1 20. The system of claim 19, wherein the validation process causes the processor to
2 execute a graph matching process from the memory to compare the input graph and the
3 template graphs.

1 21. The system of claim 20, wherein the validation process further causes the
2 processor to create adjacency matrices for the input graph and the set of template graphs
3 to compare the input graph and the template graphs.

1 22. The system of claim 19, further comprising a modification process executed by the
2 processor from the memory to cause the processor to evaluate the input graph against a set
3 of pre-defined alphabet graphs, and to apply a rule associated with a matching alphabet

graph to the input graph, wherein the rule is represented by a rule graph and a set of morphism graphs.

1 23. The system of claim 22, wherein the modification process further causes the
2 processor to execute a graph matching process from the memory to evaluate the input
3 graph.

1 24. The system of claim 23, wherein the modification process further causes the
2 processor to create adjacency matrices for the input graph and the set of alphabet graphs
3 to evaluate the input graph.

1 25. The system of claim 22, wherein the modification process further causes the
2 processor to perform a pushout operation to apply the rule.

1 26. The system of claim 22, wherein the modification process further causes the
2 processor to perform a pullback operation to apply the rule.

1 27. The system of claim 26, wherein the modification process further causes the
2 processor to create adjacency matrices representing smallest portions of the set of
3 morphism graphs that map the input and rule graphs to the alphabet graph using pre-
4 images of parts of the alphabet graph marked for change, and to multiply the adjacency
5 matrix associated with the input graph by a transpose of the adjacency matrix associated
6 with the rule graph, to perform the pullback operation.